

Copy for the Elected Office (EO/US)
PATENT COOPERATION TREATY

PCT/EP00/04230

9/980377

PCT

NOTIFICATION OF THE RECORDING
OF A CHANGE

(PCT Rule 92bis.1 and
Administrative Instructions, Section 422)

From the INTERNATIONAL BUREAU

To:

STYLE, Kelda, Camilla, Karen
Page White & Farrer
54 Doughty Street
London WC1N 2LS
ROYAUME-UNI

Date of mailing (day/month/year) 16 janvier 2002 (16.01.02)	IMPORTANT NOTIFICATION
Applicant's or agent's file reference 101635/KS/JJ	
International application No. PCT/EP00/04230	International filing date (day/month/year) 09 mai 2000 (09.05.00)

1. The following indications appeared on record concerning:

☒ the applicant ☐ the inventor ☐ the agent ☐ the common representative

Name and Address

NOKIA NETWORKS OY
Keilalahdentie 4
FIN-02150 Espoo
Finland

State of Nationality
FI

State of Residence
FI

Telephone No.

Facsimile No.

Teleprinter No.

2. The International Bureau hereby notifies the applicant that the following change has been recorded concerning:

☐ the person ☒ the name ☐ the address ☐ the nationality ☐ the residence

Name and Address

NOKIA CORPORATION
Keilalahdentie 4
FIN-02150 Espoo
Finland

State of Nationality
FI

State of Residence
FI

Telephone No.

Facsimile No.

Teleprinter No.

3. Further observations, if necessary:

4. A copy of this notification has been sent to:

☒ the receiving Office ☐ the designated Offices concerned
☐ the International Searching Authority ☒ the elected Offices concerned
☒ the International Preliminary Examining Authority ☐ other:

The International Bureau of WIPO
34, chemin des Colombettes
1211 Geneva 20, Switzerland

Facsimile No.: (41-22) 740.14.35

Authorized officer

Gabriele BAEHR

Telephone No.: (41-22) 338.83.38

PCT

NOTICE INFORMING THE APPLICANT OF THE
COMMUNICATION OF THE INTERNATIONAL
APPLICATION TO THE DESIGNATED OFFICES

(PCT Rule 47.1(c), first sentence)

From the INTERNATIONAL BUREAU

To:

STYLE, Kelda, Camilla, Karen
Page White & Farrer
54 Doughty Street
London WC1N 2LS
ROYAUME-UNI

Date of mailing (day/month/year) 14 December 2000 (14.12.00)		
Applicant's or agent's file reference 101635/KS/JJ		IMPORTANT NOTICE
International application No. PCT/EP00/04230	International filing date (day/month/year) 09 May 2000 (09.05.00)	
Priority date (day/month/year) 02 June 1999 (02.06.99)		
Applicant NOKIA NETWORKS OY et al		

1. Notice is hereby given that the International Bureau has communicated, as provided in Article 20, the international application to the following designated Offices on the date indicated above as the date of mailing of this Notice:
AG,AU,DZ,KP,KR,US

In accordance with Rule 47.1(c), third sentence, those Offices will accept the present Notice as conclusive evidence that the communication of the international application has duly taken place on the date of mailing indicated above and no copy of the international application is required to be furnished by the applicant to the designated Office(s).

2. The following designated Offices have waived the requirement for such a communication at this time:

AE,AL,AM,AP,AT,AZ,BA,BB,BG,BR,BY,CA,CH,CN,CR,CU,CZ,DE,DK,DM,EA,EE,EP,ES,FI,GB,GD,
GE,GH,GM,HR,HU,ID,IL,IN,IS,JP,KE,KG,KZ,LC,LK,LR,LS,LT,LU,LV,MA,MD,MG,MK,MN,MW,MX,
NO,NZ,OA,PL,PT,RO,RU,SD,SE,SG,SI,SK,SL,TJ,TM,TR,TT,TZ,UA,UG,UZ,VN,YU,ZA,ZW

The communication will be made to those Offices only upon their request. Furthermore, those Offices do not require the applicant to furnish a copy of the international application (Rule 49.1(a-bis)).

3. Enclosed with this Notice is a copy of the international application as published by the International Bureau on
14 December 2000 (14.12.00) under No. WO 00/76083

REMINDER REGARDING CHAPTER II (Article 31(2)(a) and Rule 54.2)

If the applicant wishes to postpone entry into the national phase until 30 months (or later in some Offices) from the priority date, a demand for international preliminary examination must be filed with the competent International Preliminary Examining Authority before the expiration of 19 months from the priority date.

It is the applicant's sole responsibility to monitor the 19-month time limit.

Note that only an applicant who is a national or resident of a PCT Contracting State which is bound by Chapter II has the right to file a demand for international preliminary examination.

REMINDER REGARDING ENTRY INTO THE NATIONAL PHASE (Article 22 or 39(1))

If the applicant wishes to proceed with the international application in the national phase, he must, within 20 months or 30 months, or later in some Offices, perform the acts referred to therein before each designated or elected Office.

For further important information on the time limits and acts to be performed for entering the national phase, see the Annex to Form PCT/IB/301 (Notification of Receipt of Record Copy) and Volume II of the PCT Applicant's Guide.

The International Bureau of WIPO 34, chemin des Colombettes 1211 Geneva 20, Switzerland	Authorized officer J. Zahra
Facsimile No. (41-22) 740.14.35	Telephone No. (41-22) 338.83.38

COPY

The demand must be filed directly with the competent International Preliminary Examining Authority or, if two or more Authorities are competent, with the one chosen by the applicant. The full name or two-letter code of that Authority may be indicated by the applicant on the line below:

IPEA/ EP

PCT 09/980377 CHAPTER II

DEMAND

under Article 31 of the Patent Cooperation Treaty:

The undersigned requests that the international application specified below be the subject of international preliminary examination according to the Patent Cooperation Treaty and hereby elects all eligible States (except where otherwise indicated).

For International Preliminary Examining Authority use only

Identification of IPEA		Date of receipt of DEMAND
Box No. I IDENTIFICATION OF THE INTERNATIONAL APPLICATION		Applicant's or agent's file reference 101635/KS/SC
International application No. PCT/EP00/04230	International filing date (day/month/year) 9 May 2000	(Earliest) Priority date (day/month/year) 2 June 1999
Title of invention A METHOD OF CONTROLLING POWER		
Box No. II APPLICANT(S)		
Name and address: (Family name followed by given name; for a legal entity, full official designation. The address must include postal code and name of country.) Nokia Networks Oy Keilalahdentie 4 FIN-02150 ESPOO Finland		Telephone No.: Facsimile No.: Teleprinter No.:
State (that is, country) of nationality: Finland (FI)	State (that is, country) of residence: Finland (FI)	
Name and address: (Family name followed by given name; for a legal entity, full official designation. The address must include postal code and name of country.) LONGONI, Fabio Visamaki 5 E 38 FIN-02130 Espoo Finland		
State (that is, country) of nationality: Italy (IT)	State (that is, country) of residence: Finland (FI)	
Name and address: (Family name followed by given name; for a legal entity, full official designation. The address must include postal code and name of country.) SALONAHON, Oscar Oksasenkatu 4 bA 8 FIN-00100 Helsinki Finland		
State (that is, country) of nationality: Finland (FI)	State (that is, country) of residence: Finland (FI)	
<input type="checkbox"/> Further applicants are indicated on a continuation sheet.		

Box No. III AGENT OR COMMON REPRESENTATIVE; OR ADDRESS FOR CORRESPONDENCE

The following person is ☒ agent ☐ common representative
 and ☒ has been appointed earlier and represents the applicant(s) also for international preliminary examination.
☐ is hereby appointed and any earlier appointment of (an) agent(s)/common representative is hereby revoked.
☐ is hereby appointed, specifically for the procedure before the International Preliminary Examining Authority, in addition to the agent(s)/common representative appointed earlier.

Name and address: *(Family name followed by given name; for a legal entity, full official designation. The address must include postal code and name of country.)*

STYLE, Kelda Camilla Karen
 PAGE WHITE & FARRER
 54 Doughty Street
 London WC1N 2LS
 United Kingdom

Telephone No.:

020 7831-7929

Facsimile No.:

020 7831-8040

Teleprinter No.:

8955681

☐ **Address for correspondence:** Mark this check-box where no agent or common representative is/has been appointed and the space above is used instead to indicate a special address to which correspondence should be sent.

Box No. IV BASIS FOR INTERNATIONAL PRELIMINARY EXAMINATION**Statement concerning amendments:***

1. The applicant wishes the international preliminary examination to start on the basis of:

☒ the international application as originally filed

the description ☒ as originally filed
☐ as amended under Article 34

the claims ☒ as originally filed
☐ as amended under Article 19 (together with any accompanying statement)
☐ as amended under Article 34

the drawings ☒ as originally filed
☐ as amended under Article 34

2. ☐ The applicant wishes any amendment to the claims under Article 19 to be considered as reversed.

3. ☐ The applicant wishes the start of the international preliminary examination to be postponed until the expiration of 20 months from the priority date unless the International Preliminary Examining Authority receives a copy of any amendments made under Article 19 or a notice from the applicant that he does not wish to make such amendments (Rule 69.1(d)). *(This check-box may be marked only where the time limit under Article 19 has not yet expired.)*

* Where no check-box is marked, international preliminary examination will start on the basis of the international application as originally filed or, where a copy of amendments to the claims under Article 19 and/or amendments of the international application under Article 34 are received by the International Preliminary Examining Authority before it has begun to draw up a written opinion or the international preliminary examination report, as so amended.

Language for the purposes of international preliminary examination: EN

- ☒ which is the language in which the international application was filed.
☐ which is the language of a translation furnished for the purposes of international search.
☐ which is the language of publication of the international application.
☐ which is the language of the translation (to be) furnished for the purposes of international preliminary examination.

Box No. V ELECTION OF STATES

The applicant hereby elects all eligible States *(that is, all States which have been designated and which are bound by Chapter II of the PCT)*

excluding the following States which the applicant wishes not to elect:

Box No. VI CHECK LIST

The demand is accompanied by the following elements, in the language referred to in Box No. IV, for the purposes of international preliminary examination:

- | | | |
|--|---|----------|
| 1. translation of international application | : | sheets |
| 2. amendments under Article 34 | : | sheets |
| 3. copy (or, where required, translation) of amendments under Article 19 | : | sheets |
| 4. copy (or, where required, translation) of statement under Article 19 | : | sheets |
| 5. letter | : | 1 sheets |
| 6. other (specify) | : | sheets |

For International Preliminary Examining Authority use only

received not received

<input type="checkbox"/>	<input type="checkbox"/>
<input type="checkbox"/>	<input type="checkbox"/>
<input type="checkbox"/>	<input type="checkbox"/>
<input type="checkbox"/>	<input type="checkbox"/>
<input type="checkbox"/>	<input type="checkbox"/>
<input type="checkbox"/>	<input type="checkbox"/>

The demand is also accompanied by the item(s) marked below:

- | | |
|--|---|
| 1. <input checked="" type="checkbox"/> fee calculation sheet | 4. <input type="checkbox"/> statement explaining lack of signature |
| 2. <input type="checkbox"/> separate signed power of attorney | 5. <input type="checkbox"/> nucleotide and or amino acid sequence listing in computer readable form |
| 3. <input type="checkbox"/> copy of general power of attorney; reference number, if any: | 6. <input type="checkbox"/> other (specify): |

Box No. VII SIGNATURE OF APPLICANT, AGENT OR COMMON REPRESENTATIVE

Next to each signature, indicate the name of the person signing and the capacity in which the person signs (if such capacity is not obvious from reading the demand).

.....
WILLIAMS, David John
Authorised Representative

For International Preliminary Examining Authority use only

1. Date of actual receipt of DEMAND:

2. Adjusted date of receipt of demand due to CORRECTIONS under Rule 60.1(b):

3. ☐ The date of receipt of the demand is AFTER the expiration of 19 months from the priority date and item 4 or 5. below, does not apply. ☐ The applicant has been informed accordingly.

4. ☐ The date of receipt of the demand is WITHIN the period of 19 months from the priority date as extended by virtue of Rule 80.5.

5. ☐ Although the date of receipt of the demand is after the expiration of 19 months from the priority date, the delay in arrival is EXCUSED pursuant to Rule 82.

For International Bureau use only

Demand received from IPEA on:

PATENT COOPERATION TREATY

PCT

INTERNATIONAL PRELIMINARY EXAMINATION REPORT

(PCT Article 36 and Rule 70)

Applicant's or agent's file reference 101635/KS/SC	See Notification of Transmittal of International Preliminary Examination Report (Form PCT/IPEA/416) FOR FURTHER ACTION	
International application No. PCT/EP00/04230	International filing date (<i>day/month/year</i>) 09/05/2000	Priority date (<i>day/month/year</i>) 02/06/1999
International Patent Classification (IPC) or national classification and IPC H04B7/005		
Applicant NOKIA NETWORKS OY et al.		

1. This international preliminary examination report has been prepared by this International Preliminary Examining Authority and is transmitted to the applicant according to Article 36.



2. This REPORT consists of a total of 5 sheets, including this cover sheet.

☒ This report is also accompanied by ANNEXES, i.e. sheets of the description, claims and/or drawings which have been amended and are the basis for this report and/or sheets containing rectifications made before this Authority (see Rule 70.16 and Section 607 of the Administrative Instructions under the PCT).

These annexes consist of a total of 3 sheets.

3. This report contains indications relating to the following items:

- I ☒ Basis of the report
- II ☐ Priority
- III ☐ Non-establishment of opinion with regard to novelty, inventive step and industrial applicability
- IV ☐ Lack of unity of invention
- V ☒ Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement
- VI ☐ Certain documents cited
- VII ☒ Certain defects in the international application
- VIII ☒ Certain observations on the international application

Date of submission of the demand 15/12/2000	Date of completion of this report 10.09.2001
Name and mailing address of the international preliminary examining authority:  European Patent Office D-80298 Munich Tel. +49 89 2399 - 0 Tx: 523656 epmu d Fax: +49 89 2399 - 4465	Authorized officer Lauri, L Telephone No. +49 89 2399 7304 <div style="text-align: right;">  </div>

INTERNATIONAL PRELIMINARY EXAMINATION REPORT

International application No. PCT/EP00/04230

I. Basis of the report

1. With regard to the **elements** of the international application (*Replacement sheets which have been furnished to the receiving Office in response to an invitation under Article 14 are referred to in this report as "originally filed" and are not annexed to this report since they do not contain amendments (Rules 70.16 and 70.17)*):

Description, pages:

1,3-12	as originally filed	
2,2a	with telefax of	09/07/2001

Claims, No.:

7-25	as originally filed	
1-6	with telefax of	09/07/2001

Drawings, sheets:

1/2,2/2	as originally filed
---------	---------------------

2. With regard to the **language**, all the elements marked above were available or furnished to this Authority in the language in which the international application was filed, unless otherwise indicated under this item.

These elements were available or furnished to this Authority in the following language: , which is:

- ☐ the language of a translation furnished for the purposes of the international search (under Rule 23.1(b)).
- ☐ the language of publication of the international application (under Rule 48.3(b)).
- ☐ the language of a translation furnished for the purposes of international preliminary examination (under Rule 55.2 and/or 55.3).

3. With regard to any **nucleotide and/or amino acid sequence** disclosed in the international application, the international preliminary examination was carried out on the basis of the sequence listing:

- ☐ contained in the international application in written form.
- ☐ filed together with the international application in computer readable form.
- ☐ furnished subsequently to this Authority in written form.
- ☐ furnished subsequently to this Authority in computer readable form.
- ☐ The statement that the subsequently furnished written sequence listing does not go beyond the disclosure in the international application as filed has been furnished.
- ☐ The statement that the information recorded in computer readable form is identical to the written sequence listing has been furnished.

**INTERNATIONAL PRELIMINARY
EXAMINATION REPORT**

International application No. PCT/EP00/04230

4. The amendments have resulted in the cancellation of:

- ☐ the description, pages:
- ☐ the claims, Nos.:
- ☐ the drawings, sheets:

5. ☐ This report has been established as if (some of) the amendments had not been made, since they have been considered to go beyond the disclosure as filed (Rule 70.2(c)):

(Any replacement sheet containing such amendments must be referred to under item 1 and annexed to this report.)

6. Additional observations, if necessary:

V. Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement

1. Statement

Novelty (N)	Yes:	Claims
	No:	Claims 1, 16, 17
Inventive step (IS)	Yes:	Claims
	No:	Claims 1, 16, 17
Industrial applicability (IA)	Yes:	Claims 1-25
	No:	Claims

2. Citations and explanations
see separate sheet

VII. Certain defects in the international application

The following defects in the form or contents of the international application have been noted:
see separate sheet

VIII. Certain observations on the international application

The following observations on the clarity of the claims, description, and drawings or on the question whether the claims are fully supported by the description, are made:
see separate sheet

**INTERNATIONAL PRELIMINARY
EXAMINATION REPORT - SEPARATE SHEET**

International application No. PCT/EP00/04230

CITED DOCUMENTS

D1: EP-A-0 892 572 (ALSTHOM CGE ALCATEL) 20 January 1999 (1999-01-20)

Re Item I

Basis of the report

Description, pages:

1,3-12	as originally filed	
2,2a	with telefax of	09/07/2001

Claims, No.:

7-25	as originally filed	
1-6	with telefax of	09/07/2001

Drawings, sheets:

1/2,2/2	as originally filed
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Re Item V

Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement

1. The present application does not meet the criterion set forth in Article 33(2) PCT because the subject-matter of claim 1 is not novel over the prior art.
Document D1 discloses a method of controlling power in the transmission of information, which shows the following features contained in claim 1:
 - the transmission takes place from a first station to a plurality of second

**INTERNATIONAL PRELIMINARY
EXAMINATION REPORT - SEPARATE SHEET**

International application No. PCT/EP00/04230

- stations (col. 1 line 50, col. 2 line 5);
 - the method comprises the step of transmitting said information in a common channel (col. 2 lines 1-2);
 - pieces of information intended for different second stations are transmitted with different power levels (col. 3 line 54 - col. 4 line 5 and col. 4 line 50 - col. 5 line 5).
2. Also claim 16 does not meet the novelty criterion set forth in Article 33(2) PCT. Claim 16 contains the same features as claim 1. The only feature which makes claim 16 different from claim 1 is that an operation mode is foreseen whereby the information intended to different second stations is transmitted with the same power. Indeed it is also envisaged in D1 (col. 4 lines 23-25) that the power control may be utilised or not. Thus the method described in D1 essentially covers all the features of claim 16.
3. The same objection as at point 1 above also applies to claim 17, which relates to the apparatus carrying out the method of claim 1.

Re Item VII

Certain defects in the international application

The features of the claims are not provided with reference signs placed in parentheses (Rule 6.2(b) PCT).

Re Item VIII

Certain observations on the international application

The term "important" used in claim 3 is vague and unclear and leaves the reader in doubt as to the meaning of the technical feature to which it refers, thereby rendering the definition of the subject-matter of said claim unclear (Article 6 PCT).

associated with a given base station will use these channels.

The data is sent in data frames. Data frames sent from the base station to the mobile stations will include the identity of the user equipment, for example the identity of a mobile station. Each mobile station will receive all the data frames sent from a base station to the mobile station on the FACH. Each mobile station is able to identify the data frame intended for that mobile station by the identity included in the frame. The frames sent from the mobile station include information identifying the source of the frames.

As a number of mobile stations or user equipment share the FACH channel it is difficult to set the power level of that channel such that it is at the lowest possible level and at a level such that all the mobile stations can receive the signals from the base station. In CDMA systems, the number of users which can be supported by the system with a given quality of service depends on the total signal power of all the users and the base station in a cell. If the total signal power is relatively high, this will provide a relatively high level of interference. This means that it may be difficult to distinguish the desired signal from the interference resulting from the other base stations. Accordingly minimisation of the power used by each user and the base station will improve the capacity and/or quality of service.

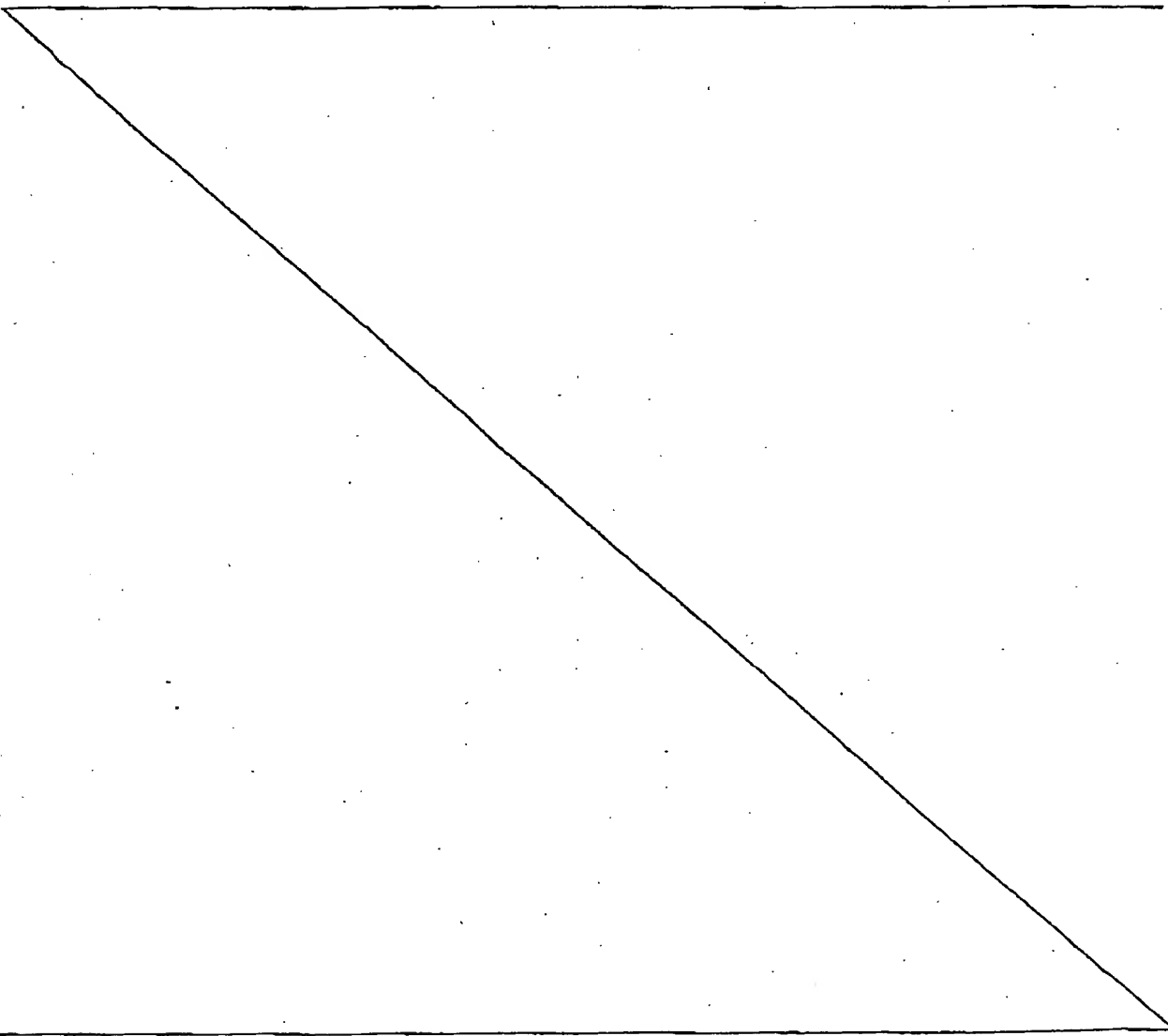
EP-A-0-892572 describes a BCCH carrier supporting a physical BCCH such that at least one BCCH timeslot is entirely received within one of the successive monitoring windows of a mobile station of an adjoining cell.

2a

SUMMARY OF THE INVENTION

It is an aim of embodiments of the present invention to provide a method which addresses this problem.

According to one aspect of the present invention, there is provided a method of controlling power with which information is transmitted by a first station to a plurality of second stations on a common channel, different information being intended for



CLAIMS

1. A method of controlling power with which information is transmitted by a first station to a plurality of second stations on a common channel, different information being intended for different stations, said method comprising the step of transmitting said information in said common channel, wherein information intended for different second stations are transmitted at different power levels.
2. A method as claimed in claim 1, wherein the power level with which information is transmitted is selected in dependence on a parameter of the intended second station and/or the content of the information.
3. A method as claimed in claim 2, wherein the information is transmitted in said channel with a higher power if the content of the information is important.
4. A method as claimed in any one of the preceding claims, wherein said information is in the form of data packets.
5. A method as claimed in any one of the preceding claims, wherein said information for a given second station includes information identifying the given station.
6. A method as claimed in any one of the preceding claims, wherein a second mode of operation is provided in which the first station sends information to said second stations with substantially the same power level, one of said first and second modes being selected.
7. A method as claimed in any one of the preceding claims, wherein said first station receives information from a controller on the power with which information for a respective second

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EPO - DG 1

09. 05. 2000

REQUEST

(46) The undersigned requests that the present international application be processed according to the Patent Cooperation Treaty.

For receiving Office use only

PCT/EP 00 / 04230

International Application No.

09 MAY 2000

International Filing Date

(09. 05. 2000)

EUROPEAN PATENT OFFICE

PCT INTERNATIONAL APPLICATION

Name of receiving Office and "PCT International Application"

Applicant's or agent's file reference 101635/KS/JJ
(if desired) (12 characters maximum)

Box No. I	TITLE OF INVENTION	
	A METHOD OF CONTROLLING POWER	
Box No. II	APPLICANT	
Name and address: (Family name followed by given name; for a legal entity, full official designation. The address must include postal code and name of country. The country of the address indicated in this Box is the applicant's State (that is, country) of residence if no State of residence is indicated below.)		<input type="checkbox"/> This person is also inventor.
Nokia Networks Oy Keilalahdentie 4 FIN-02150 ESPOO Finland		Telephone No.
		Facsimile No.
		Teleprinter No.
State (that is, country) of nationality: Finland		State (that is, country) of residence: Finland
This person is applicant for the purposes of: <input type="checkbox"/> all designated States <input checked="" type="checkbox"/> all designated States except the United States of America <input type="checkbox"/> the United States of America only <input type="checkbox"/> the States indicated in the Supplemental Box		
Box No. III	FURTHER APPLICANT(S) AND/OR (FURTHER) INVENTOR(S)	
Name and address: (Family name followed by given name; for a legal entity, full official designation. The address must include postal code and name of country. The country of the address indicated in this Box is the applicant's State (that is, country) of residence if no State of residence is indicated below.)		This person is:
LONGONI, Fabio Visamäki 5 E 38 FIN-02130 Espoo Finland		<input type="checkbox"/> applicant only
		<input checked="" type="checkbox"/> applicant and inventor
		<input type="checkbox"/> inventor only (If this check-box is marked, do not fill in below.)
State (that is, country) of nationality: Italy		State (that is, country) of residence: Finland
This person is applicant for the purposes of: <input type="checkbox"/> all designated States <input type="checkbox"/> all designated States except the United States of America <input checked="" type="checkbox"/> the United States of America only <input type="checkbox"/> the States indicated in the Supplemental Box		
<input type="checkbox"/> Further applicants and/or (further) inventors are indicated on a continuation sheet.		
Box No. IV	AGENT OR COMMON REPRESENTATIVE; OR ADDRESS FOR CORRESPONDENCE	
The person identified below is hereby/has been appointed to act on behalf of the applicant(s) before the competent International Authorities as:		<input checked="" type="checkbox"/> agent <input type="checkbox"/> common representative
Name and address: (Family name followed by given name; for a legal entity, full official designation. The address must include postal code and name of country.)		Telephone No.
STYLE, Kelda Camilla Karen Page White & Farrer 54 Doughty Street London WC1N 2LS United Kingdom		020 7831-7929
		Facsimile No.
		020 7831-8040
		Teleprinter No.
		8955681
<input type="checkbox"/> Address for correspondence: Mark this check-box where no agent or common representative is/has been appointed and the space above is used instead to indicate a special address to which correspondence should be sent.		

Continuation of Box No. III FURTHER APPLICANT(S) AND/OR (FURTHER) INVENTOR(S)	
<i>If none of the following sub-boxes is used, this sheet should not be included in the request.</i>	
<p>Name and address: <i>(Family name followed by given name; for a legal entity, full official designation. The address must include postal code and name of country. The country of the address indicated in this Box is the applicant's State (that is, country) of residence if no State of residence is indicated below.)</i></p> <p style="text-align: center;">SALONAHU, Oscar Oksasenkatu 4 bA 8 FIN-00100 Helsinki Finland</p>	<p>This person is:</p> <p><input type="checkbox"/> applicant only</p> <p><input checked="" type="checkbox"/> applicant and inventor</p> <p><input type="checkbox"/> inventor only <i>(If this check-box is marked, do not fill in below.)</i></p>
State <i>(that is, country)</i> of nationality: Finland	State <i>(that is, country)</i> of residence: Finland
<p>This person is applicant for the purposes of: <input type="checkbox"/> all designated States <input type="checkbox"/> all designated States except the United States of America <input checked="" type="checkbox"/> the United States of America only <input type="checkbox"/> the States indicated in the Supplemental Box</p>	
<p>Name and address: <i>(Family name followed by given name; for a legal entity, full official designation. The address must include postal code and name of country. The country of the address indicated in this Box is the applicant's State (that is, country) of residence if no State of residence is indicated below.)</i></p>	<p>This person is:</p> <p><input type="checkbox"/> applicant only</p> <p><input type="checkbox"/> applicant and inventor</p> <p><input type="checkbox"/> inventor only <i>(If this check-box is marked, do not fill in below.)</i></p>
State <i>(that is, country)</i> of nationality:	State <i>(that is, country)</i> of residence:
<p>This person is applicant for the purposes of: <input type="checkbox"/> all designated States <input type="checkbox"/> all designated States except the United States of America <input type="checkbox"/> the United States of America only <input type="checkbox"/> the States indicated in the Supplemental Box</p>	
<p>Name and address: <i>(Family name followed by given name; for a legal entity, full official designation. The address must include postal code and name of country. The country of the address indicated in this Box is the applicant's State (that is, country) of residence if no State of residence is indicated below.)</i></p>	<p>This person is:</p> <p><input type="checkbox"/> applicant only</p> <p><input type="checkbox"/> applicant and inventor</p> <p><input type="checkbox"/> inventor only <i>(If this check-box is marked, do not fill in below.)</i></p>
State <i>(that is, country)</i> of nationality:	State <i>(that is, country)</i> of residence:
<p>This person is applicant for the purposes of: <input type="checkbox"/> all designated States <input type="checkbox"/> all designated States except the United States of America <input type="checkbox"/> the United States of America only <input type="checkbox"/> the States indicated in the Supplemental Box</p>	
<p>Name and address: <i>(Family name followed by given name; for a legal entity, full official designation. The address must include postal code and name of country. The country of the address indicated in this Box is the applicant's State (that is, country) of residence if no State of residence is indicated below.)</i></p>	<p>This person is:</p> <p><input type="checkbox"/> applicant only</p> <p><input type="checkbox"/> applicant and inventor</p> <p><input type="checkbox"/> inventor only <i>(If this check-box is marked, do not fill in below.)</i></p>
State <i>(that is, country)</i> of nationality:	State <i>(that is, country)</i> of residence:
<p>This person is applicant for the purposes of: <input type="checkbox"/> all designated States <input type="checkbox"/> all designated States except the United States of America <input type="checkbox"/> the United States of America only <input type="checkbox"/> the States indicated in the Supplemental Box</p>	
<p><input type="checkbox"/> Further applicants and/or (further) inventors are indicated on another continuation sheet.</p>	

Box No. V DESIGNATION OF STATES

The following designations are hereby made under Rule 4.9(a) (mark the applicable check-boxes; at least one must be marked):

Regional Patent

- ☒ AP **ARIPO Patent:** GH Ghana, GM Gambia, KE Kenya, LS Lesotho, MW Malawi, SD Sudan, SL Sierra Leone, SZ Swaziland, TZ United Republic of Tanzania, UG Uganda, ZW Zimbabwe, and any other State which is a Contracting State of the Harare Protocol and of the PCT
- ☒ EA **Eurasian Patent:** AM Armenia, AZ Azerbaijan, BY Belarus, KG Kyrgyzstan, KZ Kazakhstan, MD Republic of Moldova, RU Russian Federation, TJ Tajikistan, TM Turkmenistan, and any other State which is a Contracting State of the Eurasian Patent Convention and of the PCT
- ☒ EP **European Patent:** AT Austria, BE Belgium, CH and LI Switzerland and Liechtenstein, CY Cyprus, DE Germany, DK Denmark, ES Spain, FI Finland, FR France, GB United Kingdom, GR Greece, IE Ireland, IT Italy, LU Luxembourg, MC Monaco, NL Netherlands, PT Portugal, SE Sweden, and any other State which is a Contracting State of the European Patent Convention and of the PCT
- ☒ OA **OAPI Patent:** BF Burkina Faso, BJ Benin, CF Central African Republic, CG Congo, CI Côte d'Ivoire, CM Cameroon, GA Gabon, GN Guinea, GW Guinea-Bissau, ML Mali, MR Mauritania, NE Niger, SN Senegal, TD Chad, TG Togo, and any other State which is a member State of OAPI and a Contracting State of the PCT (if other kind of protection or treatment desired, specify on dotted line)

National Patent (if other kind of protection or treatment desired, specify on dotted line):

- | | |
|--|--|
| <input checked="" type="checkbox"/> AE United Arab Emirates | <input checked="" type="checkbox"/> LR Liberia |
| <input checked="" type="checkbox"/> AL Albania | <input checked="" type="checkbox"/> LS Lesotho |
| <input checked="" type="checkbox"/> AM Armenia | <input checked="" type="checkbox"/> LT Lithuania |
| <input checked="" type="checkbox"/> AT Austria | <input checked="" type="checkbox"/> LU Luxembourg |
| <input checked="" type="checkbox"/> AU Australia | <input checked="" type="checkbox"/> LV Latvia |
| <input checked="" type="checkbox"/> AZ Azerbaijan | <input checked="" type="checkbox"/> MA Morocco |
| <input checked="" type="checkbox"/> BA Bosnia and Herzegovina | <input checked="" type="checkbox"/> MD Republic of Moldova |
| <input checked="" type="checkbox"/> BB Barbados | <input checked="" type="checkbox"/> MG Madagascar |
| <input checked="" type="checkbox"/> BG Bulgaria | <input checked="" type="checkbox"/> MK The former Yugoslav Republic of Macedonia |
| <input checked="" type="checkbox"/> BR Brazil | |
| <input checked="" type="checkbox"/> BY Belarus | <input checked="" type="checkbox"/> MN Mongolia |
| <input checked="" type="checkbox"/> CA Canada | <input checked="" type="checkbox"/> MW Malawi |
| <input checked="" type="checkbox"/> CH and LI Switzerland and Liechtenstein | <input checked="" type="checkbox"/> MX Mexico |
| <input checked="" type="checkbox"/> CN China | <input checked="" type="checkbox"/> NO Norway |
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| <input checked="" type="checkbox"/> CU Cuba | <input checked="" type="checkbox"/> PL Poland |
| <input checked="" type="checkbox"/> CZ Czech Republic | <input checked="" type="checkbox"/> PT Portugal |
| <input checked="" type="checkbox"/> DE Germany | <input checked="" type="checkbox"/> RO Romania |
| <input checked="" type="checkbox"/> DK Denmark | <input checked="" type="checkbox"/> RU Russian Federation |
| <input checked="" type="checkbox"/> DM Dominica | <input checked="" type="checkbox"/> SD Sudan |
| <input checked="" type="checkbox"/> EE Estonia | <input checked="" type="checkbox"/> SE Sweden |
| <input checked="" type="checkbox"/> ES Spain | <input checked="" type="checkbox"/> SG Singapore |
| <input checked="" type="checkbox"/> FI Finland | <input checked="" type="checkbox"/> SI Slovenia |
| <input checked="" type="checkbox"/> GB United Kingdom | <input checked="" type="checkbox"/> SK Slovakia |
| <input checked="" type="checkbox"/> GD Grenada | <input checked="" type="checkbox"/> SL Sierra Leone |
| <input checked="" type="checkbox"/> GE Georgia | <input checked="" type="checkbox"/> TJ Tajikistan |
| <input checked="" type="checkbox"/> GH Ghana | <input checked="" type="checkbox"/> TM Turkmenistan |
| <input checked="" type="checkbox"/> GM Gambia | <input checked="" type="checkbox"/> TR Turkey |
| <input checked="" type="checkbox"/> HR Croatia | <input checked="" type="checkbox"/> TT Trinidad and Tobago |
| <input checked="" type="checkbox"/> HU Hungary | <input checked="" type="checkbox"/> TZ United Republic of Tanzania |
| <input checked="" type="checkbox"/> ID Indonesia | <input checked="" type="checkbox"/> UA Ukraine |
| <input checked="" type="checkbox"/> IL Israel | <input checked="" type="checkbox"/> UG Uganda |
| <input checked="" type="checkbox"/> IN India | <input checked="" type="checkbox"/> US United States of America |
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| <input checked="" type="checkbox"/> JP Japan | <input checked="" type="checkbox"/> UZ Uzbekistan |
| <input checked="" type="checkbox"/> KE Kenya | <input checked="" type="checkbox"/> VN Viet Nam |
| <input checked="" type="checkbox"/> KG Kyrgyzstan | <input checked="" type="checkbox"/> YU Yugoslavia |
| <input checked="" type="checkbox"/> KP Democratic People's Republic of Korea | <input checked="" type="checkbox"/> ZA South Africa |
| | <input checked="" type="checkbox"/> ZW Zimbabwe |
| <input checked="" type="checkbox"/> KR Republic of Korea | |
| <input checked="" type="checkbox"/> KZ Kazakhstan | |
| <input checked="" type="checkbox"/> LC Saint Lucia | |
| <input checked="" type="checkbox"/> LK Sri Lanka | |

Check-boxes reserved for designating States which have become party to the PCT after issuance of this sheet:

- ☒ (Republic of Seychelles)
- ☒ Antigua & Barbuda
- ☒ People's Democratic Republic of Algeria

Precautionary Designation Statement: In addition to the designations made above, the applicant also makes under Rule 4.9(b) all other designations which would be permitted under the PCT except any designation(s) indicated in the Supplemental Box as being excluded from the scope of this statement. The applicant declares that those additional designations are subject to confirmation and that any designation which is not confirmed before the expiration of 15 months from the priority date is to be regarded as withdrawn by the applicant at the expiration of that time limit. (Confirmation (including fees) must reach the receiving Office within the 15-month time limit.)

EP/AL

Supplemental Box *If the Supplemental Box is not used, this sheet should not be included in the request.*

1. *If, in any of the Boxes, the space is insufficient to furnish all the information: in such case, write "Continuation of Box No. ..." [indicate the number of the Box] and furnish the information in the same manner as required according to the captions of the Box in which the space was insufficient, in particular:*

- (i) *if more than two persons are involved as applicants and/or inventors and no "continuation sheet" is available: in such case, write "Continuation of Box No. III" and indicate for each additional person the same type of information as required in Box No. III. The country of the address indicated in this Box is the applicant's State (that is, country) of residence if no State of residence is indicated below;*
 - (ii) *if, in Box No. II or in any of the sub-boxes of Box No. III, the indication "the States indicated in the Supplemental Box" is checked: in such case, write "Continuation of Box No. II" or "Continuation of Box No. III" or "Continuation of Boxes No. II and No. III" (as the case may be), indicate the name of the applicant(s) involved and, next to (each) such name, the State(s) (and/or, where applicable, ARIPO, Eurasian, European or OAPI patent) for the purposes of which the named person is applicant;*
 - (iii) *if, in Box No. II or in any of the sub-boxes of Box No. III, the inventor or the inventor/applicant is not inventor for the purposes of all designated States or for the purposes of the United States of America: in such case, write "Continuation of Box No. II" or "Continuation of Box No. III" or "Continuation of Boxes No. II and No. III" (as the case may be), indicate the name of the inventor(s) and, next to (each) such name, the State(s) (and/or, where applicable, ARIPO, Eurasian, European or OAPI patent) for the purposes of which the named person is inventor;*
 - (iv) *if, in addition to the agent(s) indicated in Box No. IV, there are further agents: in such case, write "Continuation of Box No. IV" and indicate for each further agent the same type of information as required in Box No. IV;*
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 - (vi) *if, in Box No. VI, there are more than three earlier applications whose priority is claimed: in such case, write "Continuation of Box No. VI" and indicate for each additional earlier application the same type of information as required in Box No. VI;*
 - (vii) *if, in Box No. VI, the earlier application is an ARIPO application: in such case, write "Continuation of Box No. VI", specify the number of the item corresponding to that earlier application and indicate at least one country party to the Paris Convention for the Protection of Industrial Property or one Member of the World Trade Organization for which that earlier application was filed.*
2. *If, with regard to the precautionary designation statement contained in Box No. V, the applicant wishes to exclude any State(s) from the scope of that statement: in such case, write "Designation(s) excluded from precautionary designation statement" and indicate the name or two-letter code of each State so excluded.*
3. *If the applicant claims, in respect of any designated Office, the benefits of provisions of the national law concerning non-prejudicial disclosures or exceptions to lack of novelty: in such case, write "Statement concerning non-prejudicial disclosures or exceptions to lack of novelty" and furnish that statement below.*

Continuation of Box IV

Agents continues

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 RICHARDS, DAVID JOHN (GB)
 PENDLEBURY, ANTHONY (GB)
 JENKINS, PETER DAVID (GB)
 DRIVER, VIRGINIA ROZANNE (GB)
 DANIELS, JEFFERY NICHOLAS (GB)
 NEOBARD, WILLIAM JOHN (GB)
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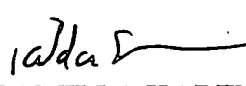
Box No. VI PRIORITY CLAIM		<input type="checkbox"/> Further priority claims are indicated in the Supplemental Box.		
Filing date of earlier application (day/month/year)	Number of earlier application	Where earlier application is:		
		national application: country	regional application:* regional Office	international application: receiving Office
item (1) (02 06 1999) 2 June 1999	9912846.4	GB		
item (2)				
item (3)				

☐ The receiving Office is requested to prepare and transmit to the International Bureau a certified copy of the earlier application(s) (only if the earlier application was filed with the Office which for the purposes of the present international application is the receiving Office) identified above as item(s):

* Where the earlier application is an ARIPO application, it is mandatory to indicate in the Supplemental Box at least one country party to the Paris Convention for the Protection of Industrial Property for which that earlier application was filed (Rule 4.10(b)(ii)). See Supplemental Box.

Box No. VII INTERNATIONAL SEARCHING AUTHORITY			
Choice of International Searching Authority (ISA) (if two or more International Searching Authorities are competent to carry out the international search, indicate the Authority chosen; the two-letter code may be used):		Request to use results of earlier search; reference to that search (if an earlier search has been carried out by or requested from the International Searching Authority):	
ISA / EP		Date (day/month/year) 16.02.00	Number RS 103356
		Country (or regional Office) EP	

Box No. VIII CHECK LIST; LANGUAGE OF FILING	
This international application contains the following number of sheets: request : 5 description (excluding sequence listing part) : 12 claims : 4 abstract : 1 drawings : 2 sequence listing part of description : Total number of sheets : 24	This international application is accompanied by the item(s) marked below: 1. <input checked="" type="checkbox"/> fee calculation sheet 2. <input type="checkbox"/> separate signed power of attorney 3. <input checked="" type="checkbox"/> copy of general power of attorney; reference number, if any: 4. <input type="checkbox"/> statement explaining lack of signature 5. <input type="checkbox"/> priority document(s) identified in Box No. VI as item(s): 6. <input type="checkbox"/> translation of international application into (language): 7. <input type="checkbox"/> separate indications concerning deposited microorganism or other biological material 8. <input type="checkbox"/> nucleotide and/or amino acid sequence listing in computer readable form 9. <input type="checkbox"/> other (specify):
Figure of the drawings which should accompany the abstract: 2	Language of filing of the international application: English

Box No. IX SIGNATURE OF APPLICANT OR AGENT	
Next to each signature, indicate the name of the person signing and the capacity in which the person signs (if such capacity is not obvious from reading the request).	
 KELDA CAMILLA KAREN STYLE.....(Agent)	

For receiving Office use only	
1. Date of actual receipt of the purported international application: 09 MAY 2000 (09 05 2000)	2. Drawings:
3. Corrected date of actual receipt due to later but timely received papers or drawings completing the purported international application:	<input checked="" type="checkbox"/> received:
4. Date of timely receipt of the required corrections under PCT Article 11(2):	<input type="checkbox"/> not received:
5. International Searching Authority (if two or more are competent): ISA /	6. <input type="checkbox"/> Transmittal of search copy delayed until search fee is paid.

For International Bureau use only
Date of receipt of the record copy by the International Bureau:

PATENT COOPERATION TREATY

PCT

INTERNATIONAL SEARCH REPORT

(PCT Article 18 and Rules 43 and 44)

Applicant's or agent's file reference 101635/KS/JJ	FOR FURTHER ACTION see Notification of Transmittal of International Search Report (Form PCT/ISA/220) as well as, where applicable, item 5 below.	
International application No. PCT/EP 00/ 04230	International filing date (day/month/year) 09/05/2000	(Earliest) Priority Date (day/month/year) 02/06/1999
Applicant NOKIA NETWORKS OY		

This International Search Report has been prepared by this International Searching Authority and is transmitted to the applicant according to Article 18. A copy is being transmitted to the International Bureau.

This International Search Report consists of a total of 3 sheets.

☒ It is also accompanied by a copy of each prior art document cited in this report.

1. Basis of the report

- a. With regard to the **language**, the international search was carried out on the basis of the international application in the language in which it was filed, unless otherwise indicated under this item.

☐ the international search was carried out on the basis of a translation of the international application furnished to this Authority (Rule 23.1(b)).

- b. With regard to any **nucleotide and/or amino acid sequence** disclosed in the international application, the international search was carried out on the basis of the sequence listing :

☐ contained in the international application in written form.

☐ filed together with the international application in computer readable form.

☐ furnished subsequently to this Authority in written form.

☐ furnished subsequently to this Authority in computer readable form.

☐ the statement that the subsequently furnished written sequence listing does not go beyond the disclosure in the international application as filed has been furnished.

☐ the statement that the information recorded in computer readable form is identical to the written sequence listing has been furnished

2. ☐ **Certain claims were found unsearchable** (See Box I).

3. ☐ **Unity of invention is lacking** (see Box II).

4. With regard to the **title**,

☒ the text is approved as submitted by the applicant.

☐ the text has been established by this Authority to read as follows:

5. With regard to the **abstract**,

☒ the text is approved as submitted by the applicant.

☐ the text has been established, according to Rule 38.2(b), by this Authority as it appears in Box III. The applicant may, within one month from the date of mailing of this international search report, submit comments to this Authority.

6. The figure of the **drawings** to be published with the abstract is Figure No.

☒ as suggested by the applicant.

☐ because the applicant failed to suggest a figure.

☐ because this figure better characterizes the invention.

2
☐ None of the figures.

INTERNATIONAL SEARCH REPORT

National Application No

PCT/EP 00/04230

A. CLASSIFICATION OF SUBJECT MATTER

IPC 7 H04B7/005 H04Q7/38

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

IPC 7 H04B H04Q

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practical, search terms used)

EPO-Internal, WPI Data, INSPEC

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	EP 0 892 572 A (ALSTHOM CGE ALCATEL) 20 January 1999 (1999-01-20) column 2, line 57 -column 6, line 4 column 7, line 23 -column 8, line 39 figure 1	1-6, 13-17, 19,22
Y	---	7-12,18, 20,21, 23-25
Y	EP 0 718 985 A (NOKIA MOBILE PHONES LTD) 26 June 1996 (1996-06-26) column 3, line 3 -column 4, line 16 column 5, line 37 -column 8, line 6 claims 1,8,10,13,23 figures 1-4	7-12,18, 20,21, 23-25

	-/--	

☒ Further documents are listed in the continuation of box C.☒ Patent family members are listed in annex.

* Special categories of cited documents:

A document defining the general state of the art which is not considered to be of particular relevance

E earlier document but published on or after the international filing date

L document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)

O document referring to an oral disclosure, use, exhibition or other means

P document published prior to the international filing date but later than the priority date claimed

T later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention

X document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone

Y document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art.

& document member of the same patent family

Date of the actual completion of the international search

28 August 2000

Date of mailing of the international search report

04/09/2000

Name and mailing address of the ISA

European Patent Office, P.B. 5818 Patentlaan 2
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Authorized officer

Yang, Y

INTERNATIONAL SEARCH REPORT

International Application No
PCT/EP 00/04230

C.(Continuation) DOCUMENTS CONSIDERED TO BE RELEVANT

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	WO 98 28859 A (NOKIA TELECOMMUNICATIONS OY ;RAITOLA MIKA (FI)) 2 July 1998 (1998-07-02) -----	

INTERNATIONAL SEARCH REPORT

Information on patent family members

International Application No

PCT/EP 00/04230

Patent document cited in search report		Publication date	Patent family member(s)	Publication date
EP 0892572	A	20-01-1999	FR 2766316 A	22-01-1999
			AU 7629198 A	28-01-1999
			JP 11075253 A	16-03-1999
EP 0718985	A	26-06-1996	GB 2296625 A	03-07-1996
			JP 8223112 A	30-08-1996
			US 6032052 A	29-02-2000
WO 9828859	A	02-07-1998	FI 964859 A	05-06-1998
			AU 5190098 A	17-07-1998
			CN 1210635 A	10-03-1999
			EP 0890225 A	13-01-1999
			JP 2000507789 T	20-06-2000
			NO 983559 A	02-10-1998

(19) World Intellectual Property Organization
International Bureau



(43) International Publication Date
14 December 2000 (14.12.2000)

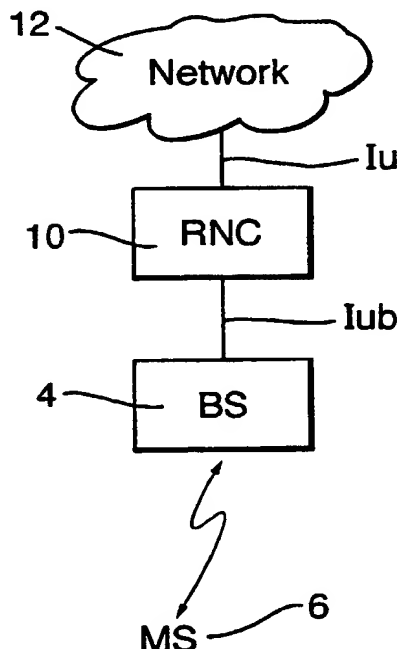
PCT

(10) International Publication Number
WO 00/76083 A1

- (51) International Patent Classification⁷: **H04B 7/005**, (74) Agents: **STYLE, Kelda, Camilla, Karen et al.**; Page White & Farrer, 54 Doughty Street, London WC1N 2LS (GB).
H04Q 7/38
- (21) International Application Number: **PCT/EP00/04230**
- (22) International Filing Date: **9 May 2000 (09.05.2000)**
- (25) Filing Language: **English**
- (26) Publication Language: **English**
- (30) Priority Data:
9912846.4 2 June 1999 (02.06.1999) **GB**
- (71) Applicant (for all designated States except US): **NOKIA NETWORKS OY** [FI/FI]; Keilalahdentie 4, FIN-02150 Espoo (FI).
- (72) Inventors; and
- (75) Inventors/Applicants (for US only): **LONGONI, Fabio** [IT/FI]; Visamäki 5 E 38, FIN-02130 Espoo (FI). **SALON-AHO, Oscar** [FI/FI]; Oksasenkatu 4 bA 8, FIN-00100 Helsinki (FI).
- (81) Designated States (*national*): AE, AG, AL, AM, AT, AU, AZ, BA, BB, BG, BR, BY, CA, CH, CN, CR, CU, CZ, DE, DK, DM, DZ, EE, ES, FI, GB, GD, GE, GH, GM, HR, HU, ID, IL, IN, IS, JP, KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MA, MD, MG, MK, MN, MW, MX, NO, NZ, PL, PT, RO, RU, SD, SE, SG, SI, SK, SL, TJ, TM, TR, TT, TZ, UA, UG, US, UZ, VN, YU, ZA, ZW.
- (84) Designated States (*regional*): ARIPO patent (GH, GM, KE, LS, MW, SD, SL, SZ, TZ, UG, ZW), Eurasian patent (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM), European patent (AT, BE, CH, CY, DE, DK, ES, FI, FR, GB, GR, IE, IT, LU, MC, NL, PT, SE), OAPI patent (BF, BJ, CF, CG, CI, CM, GA, GN, GW, ML, MR, NE, SN, TD, TG).
- Published:
— With international search report.

[Continued on next page]

(54) Title: A METHOD OF CONTROLLING POWER



(57) Abstract: A method of controlling power with which information is transmitted by a first station (4) to a plurality of second stations (6) on a common channel, different information being intended for different stations, said method comprising the step of transmitting said information in said common channel, wherein information intended for different second stations (6) are transmitted at different power levels.

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For two-letter codes and other abbreviations, refer to the "Guidance Notes on Codes and Abbreviations" appearing at the beginning of each regular issue of the PCT Gazette.

A METHOD OF CONTROLLING POWER**FIELD OF THE INVENTION**

5 The present invention relates to a method of controlling power with which information is transmitted in a common channel. The method may, but not necessarily be used in a wireless cellular system. The information may, but not necessarily be frames of data.

BACKGROUND OF THE INVENTION

10 The use of code division multiple access (CDMA) is being proposed for the next generation of cellular telecommunication networks. Additionally, code division multiple access is also being used in 15 the IS-95 Standard in the USA. CDMA is a direct sequence spread spectrum technique. In a wireless cellular network using CDMA, the mobile terminals in one cell associated with a first base station will use the same frequency as mobile stations in an 20 adjacent cell associated with a second base station. The different mobile stations can be distinguished by the respective base stations as each mobile station will be using a different spreading code.

25 In the proposals for the wideband CDMA standard, it has been proposed that a mobile station or other user equipment in a RACH (random access channel)/FACH (forward access channel) state use the uplink RACH channel to transmit data or messages to a base station and listen to the downlink FACH for data or messages from 30 the base station. In the RACH/FACH there is little or not data being transmitted between the mobile station and the base station such that no dedicated channels have been set up therebetween. The FACH and RACH channels are both common channels which means that all the user equipment including mobile stations in a cell

associated with a given base station will use these channels.

The data is sent in data frames. Data frames sent from the base station to the mobile stations will include the identity of the user equipment, for example the identity of a mobile station. Each mobile station will receive all the data frames sent from a base station to the mobile station on the FACH. Each mobile station is able to identify the data frame intended for that mobile station by the identity included in the frame. The frames sent from the mobile station include information identifying the source of the frames.

As a number of mobile stations or user equipment share the FACH channel it is difficult to set the power level of that channel such that it is at the lowest possible level and at a level such that all the mobile stations can receive the signals from the base station. In CDMA systems, the number of users which can be supported by the system with a given quality of service depends on the total signal power of all the users and the base station in a cell. If the total signal power is relatively high, this will provide a relatively high level of interference. This means that it may be difficult to distinguish the desired signal from the interference resulting from the other base stations. Accordingly minimisation of the power used by each user and the base station will improve the capacity and/or quality of service.

SUMMARY OF THE INVENTION

It is an aim of embodiments of the present invention to provide a method which addresses this problem.

According to one aspect of the present invention, there is provided a method of controlling power with which information is transmitted by a first station to a plurality of second stations on a common channel, different information being intended for

different stations, said method comprising the step of transmitting said information in said common channel, wherein information intended for different second stations are transmitted at different power levels.

5

The power level with which information is transmitted is preferably selected in dependence on a parameter of the intended second station and/or the content of the information. The information may be transmitted in the channel with the higher power if the content of the information is relatively important. Preferably, the information is in the form of data packets.

10

The information for a given second station may include information identifying the given station. A second mode of operation may be provided in which the first station sends information to the second stations with substantially the same power level, one of the first and second modes being selected.

15

The first station may receive information from a controller on the power with which information for a respective second station is to be transmitted. The controller may be arranged to send a channel configuration message to the first station to control which of the first and second modes is to be used. The first station may be arranged to send a message to the controller advising the controller if it can perform the mode contained in the channel configuration message. The controller may be arranged to send a channel configuration message to the first station to advise the first station as to the range of power levels which are to be used to transmit information to the second station.

20

25

Values representing the power values may be sent to the first station by the controller, the values being mapped to the power levels which are used by the first station to transmit information to the second station.

30

35

Preferably, the controller is a radio network controller. This may be in a CDMA network, such as the UMTS network. The first station may be a base station. The second station may comprise mobile stations or any other suitable form of user equipment.

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The common channel may be a forward access channel.

According to a second aspect of the present invention, there is provided a method of controlling power with which information is transmitted by a first station to a plurality of second stations on a common channel, different information being intended for different stations, said method comprising a first mode in which the information is transmitted with a the same power and a second mode in which different powers are used for information intended for different second stations.

According to a third aspect of the present invention, there is provided a network comprising a first station and a plurality of second stations, said first station being arranged to transmit different information intended for different second stations on a common channel, said first station have a mode of operation in which said first station is arranged to transmit information intended for different second stations on the common channel at different power levels, and a controller which is arranged to supply information as to the power to be used for said information to said first station.

BRIEF DESCRIPTION OF THE DRAWINGS

For a better understanding of the present invention and as to how the same may be carried into effect, reference will now be made by way of example to the accompanying drawings in which:

Figure 1 shows a schematic diagram of part of a cellular telecommunications network incorporating base transceiver

stations and mobile stations;

Figure 2 shows the hierarchy of elements of the network of Figure 1;

Figure 3 shows a schematic view of a frame to be sent on the FACH channel from a base station to a mobile station; and

Figure 4 shows a schematic view of the transfer of information between a RNC (radio network controller) and the base station.

DETAILED DESCRIPTION OF PREFERRED EMBODIMENTS

Reference will first be made to Figure 1 in which three cells 2 of a cellular telecommunications network are shown. Each cell 2 is served by a respective base transceiver station (BTS) 4. Each base transceiver station 4 is arranged to transmit signals to and receive signals from the mobile stations 6 located in the cell associated with the given base transceiver station 4. Likewise, each mobile station 6 is able to transmit signals to and receive signals from the respective base transceiver station 4.

The cellular telecommunications network shown in Figure 1 uses a code division multiple access technique.

Reference is made to Figure 2 which shows the hierarchy of a CDMA system. As can be seen, the mobile station 6 is in wireless communication with the base station. Typically a number of mobile stations will be in communication with each base station although only one mobile station is shown in Figure 2 for clarity. The base station 4 is connected to a radio network controller RNC 10. Again more than one base station is usually connected to each RNC 10 although only one is shown for clarity. Typically more than one RNC is provided in a network. The RNC 10 is connected to other elements of the network 12.

The RNC 10 is arranged to control the base station and also passes on the data packets to be transmitted to the mobile

station by the base station. The RNC 10 will also receive from the base station packets of data which it has received from the mobile station.

5 Common channels are defined between the mobile stations in the cell associated with a given base station and the given base station. These common channels are the forward access channel (FACH) in the downlink direction and the random access channel (RACH) in the uplink direction. The common channel may
10 alternatively be a downlink shared channel to which a number of mobile stations are allocated. With common channels the same spreading code is used for all communications on a given channel. As mentioned hereinbefore, the data sent to the mobile station and the data sent from the mobile station is in packet form. The
15 data packets which are sent to the mobile stations on the FACH will include information identifying the mobile station for which a given packet is intended. A mobile station will receive all the packets sent on the common FACH channel and is able to identify the packets which are intended for it from the information
20 identifying the mobile station. Similarly packets of data which are transmitted to the base station by the mobile stations on the common RACH channel will include information in the data packet which allows the base station to identify from which mobile station the data packet had been received.

25 The mobile stations and the base stations use the common channels when the amount of data is small and/or sporadic. This means that dedicated channels do not then need to be established. This increases the radio resources available so that more users can be
30 supported and/or the quality of the users is improved.

The base station receives the frames in the RACH channel from the mobile stations and forwards these frames to the RNC 10 via the Iub interface between the base station 4 and the RNC 10. The
35 packets of data to be transmitted to the mobile station on the

FACH channel are received by the base station from the RNC 10. The packets are transferred from the RNC 10 to the base station 4 via the Iub interface. For the transmission of packets between the base station 4 and the RNC 10, the CCH (common channel) frame protocol is used. The frame structure used for the communication of the data between the RNC 10 and the base station 4 will be described hereinafter.

In the embodiments of the invention the power at which the FACH is transmitted is set at the minimum value which allows the frames to be correctly received at the mobile stations. The power level at which the frames are sent should be such that the mobile stations can receive the frames within the cell and that the degree of interference caused in other cells is as low as possible. Additionally the interference to other users in the cell should be minimised. This allows transmission resources to be saved.

In a first embodiment of the present invention, fixed power control is used. The FACH channel is configured in the base station. This differs from the second embodiment where the FACH channel is set up by the RNC 10. The configuring of the FACH channel in the base station can be done with a layer 3 message over the Iub interface which is between the base station and the RNC. Alternatively, the configuring of the FACH channel in the base station can be done in response to O&M (operation and maintenance) procedures.

In the fixed power control mode, a constant value for the FACH channel transmission power is set. This set power level is used for every frame transmitted on the FACH channel. In other words all of the frames transmitted by the base station in the FACH channel will have the same transmitted power regardless of the mobile station for which the data frame is intended. The power is thus constant for each FACH channel frame and for each mobile

station.

The power value set by the RNC can be modified by the base station if required. For example if conditions change or if the base station receives requests to increase its power from the mobile stations, the power level may be altered.

Any suitable method can be used to determine the power at which the FACH channel is to be transmitted. For example, the base station can measure the received signal strength from the mobile stations and select a signal strength based on the received signals. Alternatively, if the base station knows the location of the mobile stations, the signal strength can be selected such that the mobile station which is furthest from the base station receives the frames with the minimum level required. Any other suitable method can be used to determine the power which takes into account at least one parameter relating to the mobile stations. In preferred embodiments of the present invention the value used to transmit the frames to the mobile stations is always the same but will vary in order to take into account changes in the cell.

In a second embodiment of the present invention, dynamic power control is used. In dynamic power control the power with which each frame is transmitted is varied in dependence on a parameter of the destination mobile station. Thus the power at which data frames are transmitted may vary from frame to frame. In this embodiment, when the forward access channel is to be set up, it is indicated to the base station that the power with which each frame is to be transmitted is set by the RNC 10. This information may be provided from the RNC 10 to the base station via the Iub interface or in any other suitable manner.

The RNC 10 receives information from the mobile stations via the base station. This information may include measurement reports

where the mobile station provides information on the strength with which it receives signals from the base station. Alternatively or additionally, the RNC 10 may receive information from the base station as to the strength with which it has received signals from the mobile station. Either or both of these types of information allow the RNC 10 to determine an appropriate power level with which a given frame should be transmitted to a given mobile station on the FACH. This type of power control is referred to as open loop power control.

10 Any other suitable information may be supplied to the RNC 10 in order to allow it to determine a suitable power level. This may be in addition to or as an alternative to the received signal strength report(s). For example, the received signal strength reports may include an indication as to the quality of the signal. The RNC 10 may use information on the position of the mobile station to determine the strength with which frames are transmitted to the mobile station. The position may be obtained from information provided by the base station and/or the mobile station.

20 The base station may in certain circumstances alter the power set by the RNC 10. The base station may take into account other factors in modifying the power with which it transmits to the mobile stations. These factors can for example take into account the conditions in the cell, the location of the mobile station in the cell, the total amount of traffic or users in the cell or the like. Alternative the power level can be altered in response to the strength of signals received at the base station.

30 The power used for the transmission of a frame may be selected in accordance with the importance of the data contained within the frame. If the data contained in the frame is relatively important the power with which that frame is transmitted can be increased.

Based on the determination made by the RNC 10, a power is determined which is the power with which a given frame is to be transmitted to the mobile station. This power level is inserted in the CCH frame protocol frame and is sent to the base station 4. The base station 4 uses this power level to transmit the associated frame to the mobile station on the common channel FACH. The power level sent by the RNC 10 to the base station can be the actual power level to be used. However in preferred embodiments of the invention, the power level can be sent as a coded value. This coded value is received by the base station and is mapped onto the actual power level using the maximum and minimum power limits.

In the FACH channel set up message sent from the RNC 10 to the base station 4, there is an indication as the maximum and minimum transmission power levels which are forwarded to the base station for the packets transmitted passed from the RNC 10 to the base station 4. The CCH frame protocol frames from the RNC to the base station contain the power level to be used by the base station for the transmission of the frame in the FACH channel. The structure of the frame sent from the RNC 10 to the base station 4 is shown in Figure 3. The frame contains information on the power level PC, the data DATA, the frame number FN and an error correction part CRC.

In a third embodiment of the present invention, the FACH may sometimes use fixed power control and at other times may use dynamic power control. This third embodiment will be described in relation to Figure 4.

In this third embodiment, the FACH channel set up message 14 sent from the RNC 10 to the base station 4 will include an indication if fixed or dynamic power control is used. The set up message may have a power mode bit which has one value if fixed power control is used and another value if dynamic power control is used. The

base station will send an acknowledgement message advising the RNC that it has understood which mode is to be used and that the FACH channel is to be set up.

5 If the set up message from the RNC 10 to the base station 4 does not include any indication as to the power control mode, it may be assumed that the dynamic power control mode is being used. It should be noted that if the RNC 10 is arranged to always provide power control information to the base station, the RNC can
10 provide constant power control values in the fixed power control mode and varying power control values in the normal mode. In this latter case, the base station would not need to be advised of the mode.

15 If the base station is not able to support one of the modes, the base station will advise the RNC of this in the acknowledgement message which it sends to the RNC 10.

A given base station may not be able to support one of the modes,
20 probably the dynamic mode. In that case, the other mode will be used. In a network some base stations will be able to use both modes whilst other base stations will only be able to support one or other of the modes.

25 In a default mode of operation, the power used to transmit the FACH channel may be set to a default value. This default value may be relatively high to ensure that all the mobile stations are able to receive their data frames. This default mode may be provided in any of the three embodiments described hereinbefore.
30 One or other of the dynamic and fixed power control modes may be a default mode.

The frame protocol used may have any suitable format. For example the frame protocol may be in accordance with the 25.435 and
35 25.437 standards of the UMTS (universal mobile telecommunications

system).

In this description, reference has been made to mobile stations.

However, it should be appreciated that embodiments of the present invention are applicable to any other type of user equipment which communicates with the base station or similar station using radio waves or the like. The user equipment may in some embodiments of the invention be computer terminals or the like. The user equipment need not be mobile.

It should be appreciated that in the new CDMA standard, base stations are sometimes referred to as node B.

It should be appreciated that whilst embodiments of the present invention have been described in the context of a CDMA system, embodiments of the present invention can be used with any other spread spectrum technique, with time division multiple access systems, frequency division multiple access and hybrids thereof.

CLAIMS

1. A method of controlling power with which information is transmitted by a first station to a plurality of second stations on a common channel, different information being intended for different stations, said method comprising the step of transmitting said information in said common channel, wherein information intended for different second stations are transmitted at different power levels.

2. A method as claimed in claim 1, wherein the power level with which information is transmitted is selected in dependence on a parameter of the intended second station and/or the content of the information.

3. A method as claimed in claim 2, wherein the information is transmitted in said channel with a higher power if the content of the information is relatively important.

4. A method as claimed in any one of the preceding claims, wherein said information is in the form of data packets.

5. A method as claimed in any one of the preceding claims, wherein said information for a given second station includes information identifying the given station.

6. A method as claimed in any one of the preceding claims, wherein a second mode of operation is provided in which the first station sends information to said second stations with substantially the same power level, one of said first and second modes being selected.

7. A method as claimed in any one of the preceding claims, wherein said first station receives information from a controller on the power with which information for a respective second

station is to be transmitted.

8. A method as claimed in claim 6 and 7, wherein the controller is arranged to send a channel configuration message to the first station to control which of said first and second modes is be used.

9. A method as claimed in claim 8, wherein said first station is arranged to send a message to said controller advising the controller if it can perform the mode contained in the channel configuration message.

10. A method as claimed in claimed in any of claims 7 to 9, wherein said controller is arranged to send a channel configuration message to the first station to advise the first station as to the range of power levels are to be used to transmit information to the second stations.

11. A method as claimed in any of claims 7 to 10, wherein values representing the power levels are sent to the first station by said controller, said values being mapped to the power levels which are used by said first station to transmit information to said second station.

12. A method as claimed in any of claims 7 to 11, wherein said controller is a radio network controller.

13. A method as claimed in any one of the preceding claims, wherein said first station is a base station.

14. A method as claimed in any one of the preceding claims, wherein said second stations comprise mobile stations.

15. A method as claimed in any preceding claim wherein said common channel is a forward access channel.

16. A method of controlling power with which information is transmitted by a first station to a plurality of second stations on a common channel, different information being intended for different stations, said method comprising a first mode in which the information is transmitted with a the same power and a second mode in which different powers are used for information intended for different second stations.

17. A network comprising a first station and a plurality of second stations, said first station being arranged to transmit different information intended for different second stations on a common channel, said first station have a mode of operation in which said first station is arranged to transmit information intended for different second stations on the common channel at different power levels.

18. A network as claimed in claim 17 comprising a controller which is arranged to supply information as to the power to be used for said information to said first station.

19. A network as claimed in claim 17 or 18, wherein said power level is selected in dependence on a parameter of the intended second station and/or the content of the information.

20. A network as claimed in claim 17,18 or 19, wherein said controller is a radio network controller, said first station is a base station and said second stations are user terminals.

21. A network as claimed in claim 17, 18, 19 or 20, wherein information sent from said controller to the base station comprises said power information and said information for a second station.

22. A network as claimed in any of claims 17 to 21, wherein a

second mode of operation is provided in which the first station sends information to said second stations with substantially the same power level, one of said first and second modes being selected.

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23. A network as claimed in claim 22, wherein the controller is arranged to send a channel configuration message to the first station to control which of said first and second modes is be used.

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24. A network as claimed in claim 22 or 23, wherein said first station is arranged to send a message to said controller advising the controller if it can perform the mode contained in the channel configuration message.

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25. A network as claimed in claimed in any of claims 17 to 24, wherein said controller is arranged to send a channel configuration message to the first station to advise the first station as to the range of power levels are to be used to
20 transmit information to the second stations.

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Fig.1.

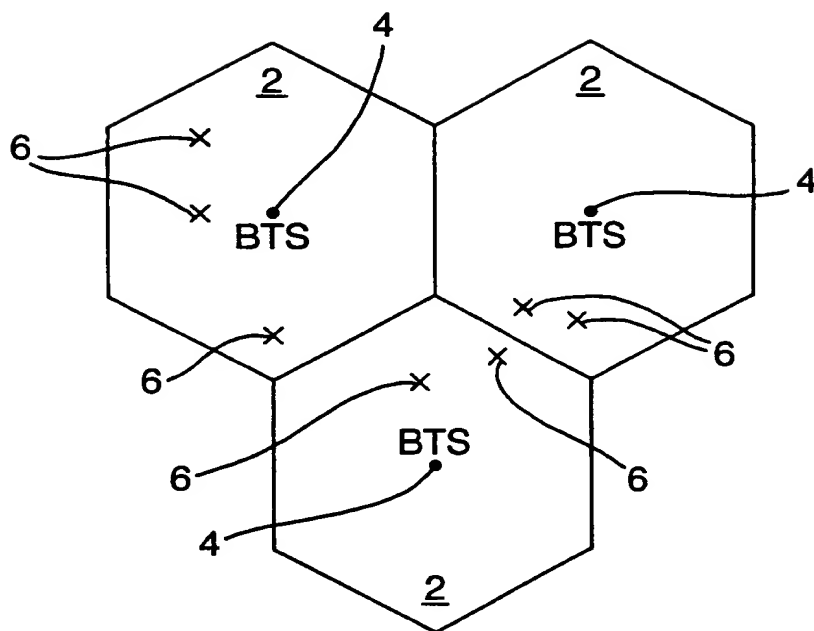
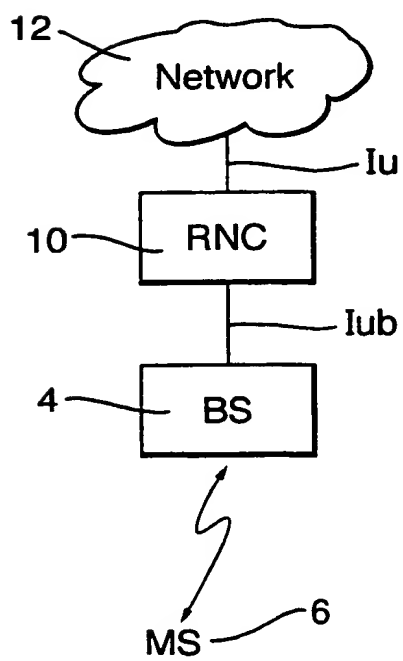


Fig.2.



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Fig.3.

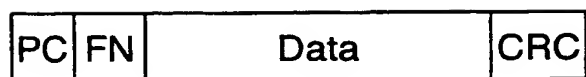
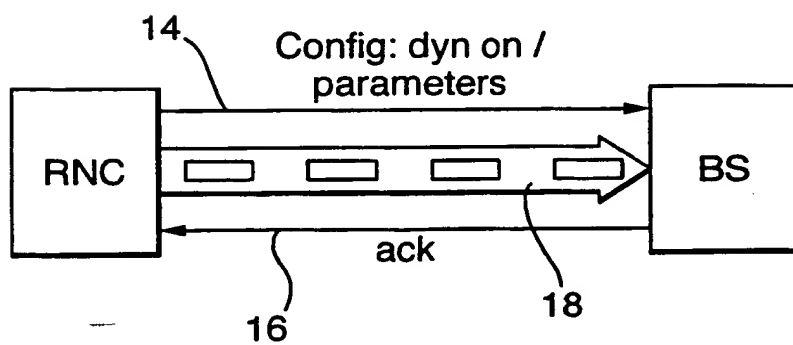


Fig.4.



INTERNATIONAL SEARCH REPORT

Intern: Application No

PCT/EP 00/04230

A. CLASSIFICATION OF SUBJECT MATTER
IPC 7 H04B7/005 H04Q7/38

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

IPC 7 H04B H04Q

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practical, search terms used)

EPO-Internal, WPI Data, INSPEC

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	EP 0 892 572 A (ALSTHOM CGE ALCATEL) 20 January 1999 (1999-01-20) column 2, line 57 -column 6, line 4 column 7, line 23 -column 8, line 39 figure 1	1-6, 13-17, 19,22
Y	---	7-12,18, 20,21, 23-25
Y	EP 0 718 985 A (NOKIA MOBILE PHONES LTD) 26 June 1996 (1996-06-26) column 3, line 3 -column 4, line 16 column 5, line 37 -column 8, line 6 claims 1,8,10,13,23 figures 1-4 --- -/--	7-12,18, 20,21, 23-25

☒ Further documents are listed in the continuation of box C.

☒ Patent family members are listed in annex.

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- *Y* document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art.
- *&* document member of the same patent family

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INTERNATIONAL SEARCH REPORT

Inter: Application No

PCT/EP 00/04230

C.(Continuation) DOCUMENTS CONSIDERED TO BE RELEVANT

Category °	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
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INTERNATIONAL SEARCH REPORT

Information on patent family members

Inter Application No

PCT/EP 00/04230

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